

## AMENDMENTS

## In the Claims:

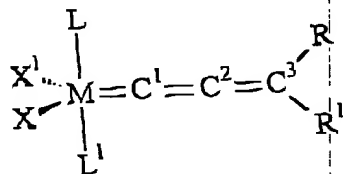
Please cancel claims 10, 15 and 16. Please amend claims 9, 11, 13, 14, 17, 23-28, and 32-34; and add new claims 39-78 as described below:

We have attached to this response a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made".

## Amended Claims

Please amend 9, 11, 13, 14, 17, 23-28, and 32-34 as follows:

9. (Amended) A catalytic complex of the formula:



wherein M is Os or Ru;

C<sup>1</sup> and C<sup>2</sup> are sp-hybridized carbons and C<sup>3</sup> is an sp<sup>2</sup> hybridized carbon,

wherein either or both of C<sup>1</sup> and C<sup>2</sup> are optionally absent;

R and R<sup>1</sup> are independently selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>2</sub>-C<sub>20</sub> alkenyl, C<sub>2</sub>-C<sub>20</sub> alkynyl, C<sub>2</sub>-C<sub>20</sub> alkoxycarbonyl, aryl, C<sub>1</sub>-C<sub>20</sub> carboxylate, C<sub>1</sub>-C<sub>20</sub> alkoxy, C<sub>2</sub>-C<sub>20</sub> alkenyloxy, C<sub>2</sub>-C<sub>20</sub> alkynyloxy, or aryloxy, each R and R<sup>1</sup> optionally being substituted with C<sub>1</sub>-C<sub>5</sub> alkyl, halogen, C<sub>1</sub>-C<sub>6</sub> alkoxy, or with a phenyl group substituted with halogen, C<sub>1</sub>-C<sub>5</sub> alkyl or C<sub>1</sub>-C<sub>5</sub> alkoxy;

X and X<sup>1</sup> are independently selected from the group consisting of anionic

ligands;

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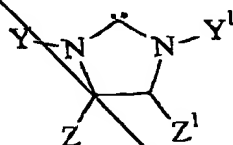
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L is selected from the group consisting of phosphine, sulfonated phosphine, phosphite, phosphinite, phosphonite, ether, amine, amide, sulfoxide, carbonyl, nitrosyl, pyridine and thioether, and

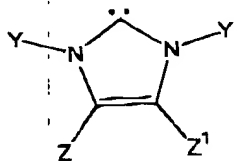
L' is a nucleophilic carbene.

11. (Amended) A catalytic complex according to claim 9, wherein L is a phosphine.

13. (Amended) A catalytic complex according to claim 9, wherein said nucleophilic carbene is of the formula:



or



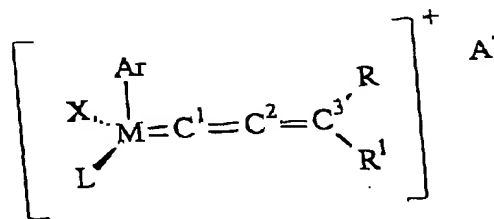
wherein

Y and Y' are independently selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>2</sub>-C<sub>20</sub> alkenyl, C<sub>2</sub>-C<sub>20</sub> alkynyl, C<sub>2</sub>-C<sub>20</sub> alkoxy, C<sub>2</sub>-C<sub>20</sub> alkoxy, C<sub>2</sub>-C<sub>20</sub> alkenyloxy, C<sub>2</sub>-C<sub>20</sub> alkynyloxy, or aryloxy, each Y and Y' optionally being substituted with C<sub>1</sub>-C<sub>5</sub> alkyl, halogen, C<sub>1</sub>-C<sub>6</sub> alkoxy, or with a phenyl group substituted with halogen, C<sub>1</sub>-C<sub>5</sub> alkyl or C<sub>1</sub>-C<sub>5</sub> alkoxy and;

Z and Z' are independently selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>2</sub>-C<sub>20</sub> alkenyl, C<sub>2</sub>-C<sub>20</sub> alkynyl, C<sub>2</sub>-C<sub>20</sub> alkoxy, C<sub>2</sub>-C<sub>20</sub> alkoxy, C<sub>2</sub>-C<sub>20</sub> alkenyloxy, C<sub>2</sub>-C<sub>20</sub> alkynyloxy, or aryloxy, each Z and Z' optionally being substituted with C<sub>1</sub>-C<sub>5</sub> alkyl, halogen, C<sub>1</sub>-C<sub>6</sub> alkoxy, or with a phenyl group substituted with halogen, C<sub>1</sub>-C<sub>5</sub> alkyl or C<sub>1</sub>-C<sub>5</sub> alkoxy.

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14. (Amended) A catalytic complex of the formula:



wherein

$\text{C}^1$  and  $\text{C}^2$  are  $\text{sp}$ -hybridized carbons and  $\text{C}^3$  is an  $\text{sp}^2$ -hybridized carbon,

wherein either or both of  $\text{C}^1$  and  $\text{C}^2$  are optionally absent;

M is selected from the group consisting of Os and Ru;

R and  $\text{R}^1$  are independently selected from the group consisting of hydrogen,  $\text{C}_1\text{-C}_{20}$  alkyl,  $\text{C}_2\text{-C}_{20}$  alkenyl,  $\text{C}_2\text{-C}_{20}$  alkynyl,  $\text{C}_2\text{-C}_{20}$  alkoxycarbonyl, aryl,  $\text{C}_1\text{-C}_{20}$  carboxylate,  $\text{C}_1\text{-C}_{20}$  alkoxy,  $\text{C}_2\text{-C}_{20}$  alkenyloxy,  $\text{C}_2\text{-C}_{20}$  alkynyloxy, or aryloxy, each R and  $\text{R}^1$  optionally being substituted with  $\text{C}_1\text{-C}_5$  alkyl, halogen,  $\text{C}_1\text{-C}_6$  alkoxy, or with a phenyl group substituted with halogen,  $\text{C}_1\text{-C}_5$  alkyl or  $\text{C}_1\text{-C}_5$  alkoxy;

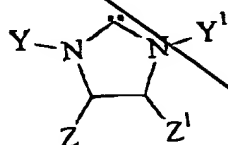
X is an anionic ligand; and

L is a nucleophilic carbene; and

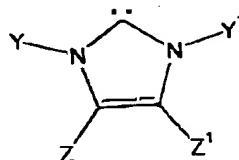
Ar is an aryl substituent, bonded to M by an  $\eta^6$  bond.

$\text{A}^-$  is an inorganic anion or an organic anion.

17. (Amended) A catalytic complex according to claim 14, wherein said nucleophilic carbene is of the formula:



or



wherein

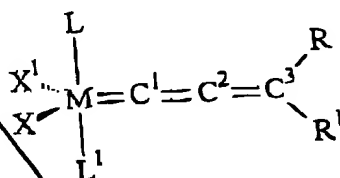
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Y and Y<sup>1</sup> are independently selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>2</sub>-C<sub>20</sub> alkenyl, C<sub>2</sub>-C<sub>20</sub> alkynyl, C<sub>2</sub>-C<sub>20</sub> alkoxy carbonyl, aryl, C<sub>1</sub>-C<sub>20</sub> carboxylate, C<sub>1</sub>-C<sub>20</sub> alkoxy, C<sub>2</sub>-C<sub>20</sub> alkenyloxy, C<sub>2</sub>-C<sub>20</sub> alkynyloxy, or aryloxy, each Y and Y<sup>1</sup> optionally being substituted with C<sub>1</sub>-C<sub>5</sub> alkyl, halogen, C<sub>1</sub>-C<sub>6</sub> alkoxy, or with a phenyl group substituted with halogen, C<sub>1</sub>-C<sub>5</sub> alkyl or C<sub>1</sub>-C<sub>5</sub> alkoxy and;

Z and Z<sup>1</sup> are independently selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>2</sub>-C<sub>20</sub> alkenyl, C<sub>2</sub>-C<sub>20</sub> alkynyl, C<sub>2</sub>-C<sub>20</sub> alkoxy carbonyl, aryl, C<sub>1</sub>-C<sub>20</sub> carboxylate, C<sub>1</sub>-C<sub>20</sub> alkoxy, C<sub>2</sub>-C<sub>20</sub> alkenyloxy, C<sub>2</sub>-C<sub>20</sub> alkynyloxy, or aryloxy, each Z and Z<sup>1</sup> optionally being substituted with C<sub>1</sub>-C<sub>5</sub> alkyl, halogen, C<sub>1</sub>-C<sub>6</sub> alkoxy, or with a phenyl group substituted with halogen, C<sub>1</sub>-C<sub>5</sub> alkyl or C<sub>1</sub>-C<sub>5</sub> alkoxy.

23. (Amended) A method of performing ring closing metathesis, said method comprising contacting a diene with a catalytic complex under conditions appropriate, and for a time sufficient to produce a cyclic alkene, wherein the catalytic complex has the formula:



wherein M is Os or Ru;

C<sup>1</sup> and C<sup>2</sup> are sp<sup>2</sup>-hybridized carbons and C<sup>3</sup> is a sp<sup>2</sup>-hybridized carbon,

wherein either or both of C<sup>1</sup> and C<sup>2</sup> are optionally absent;

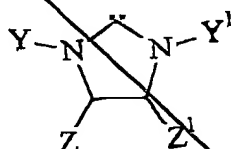
R and R<sup>1</sup> are independently selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>2</sub>-C<sub>20</sub> alkenyl, C<sub>2</sub>-C<sub>20</sub> alkynyl, C<sub>2</sub>-C<sub>20</sub> alkoxy carbonyl, aryl, C<sub>1</sub>-C<sub>20</sub> carboxylate, C<sub>1</sub>-C<sub>20</sub> alkoxy, C<sub>2</sub>-C<sub>20</sub> alkenyloxy, C<sub>2</sub>-C<sub>20</sub> alkynyloxy, or aryloxy, each R and R<sup>1</sup> optionally being substituted with C<sub>1</sub>-C<sub>5</sub> alkyl, halogen, C<sub>1</sub>-C<sub>6</sub> alkoxy, or with a phenyl group substituted with halogen, C<sub>1</sub>-C<sub>5</sub> alkyl or C<sub>1</sub>-C<sub>5</sub> alkoxy;

X and X<sup>1</sup> are independently selected from the group consisting of anionic ligands;

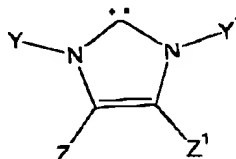
L is selected from the group consisting of phosphine, sulfonated phosphine, phosphite, phosphinite, phosphonite, ether, amine, amide, sulfoxide, carbonyl, nitrosyl, pyridine and thioether; and

L<sup>1</sup> is a nucleophilic carbene.

24. (Amended) The method of claim 23, wherein the nucleophilic carbene has the formula:



or



wherein

Y and Y<sup>1</sup> are independently selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>2</sub>-C<sub>20</sub> alkenyl, C<sub>2</sub>-C<sub>20</sub> alkynyl, C<sub>2</sub>-C<sub>20</sub> alkoxycarbonyl, aryl, C<sub>1</sub>-C<sub>20</sub> carboxylate, C<sub>1</sub>-C<sub>20</sub> alkoxy, C<sub>2</sub>-C<sub>20</sub> alkenyloxy, C<sub>2</sub>-C<sub>20</sub> alkynyloxy, or aryloxy, each Y and Y<sup>1</sup> optionally being substituted with C<sub>1</sub>-C<sub>5</sub> alkyl, halogen, C<sub>1</sub>-C<sub>6</sub> alkoxy, or with a phenyl group substituted with halogen, C<sub>1</sub>-C<sub>5</sub> alkyl or C<sub>1</sub>-C<sub>5</sub> alkoxy and;

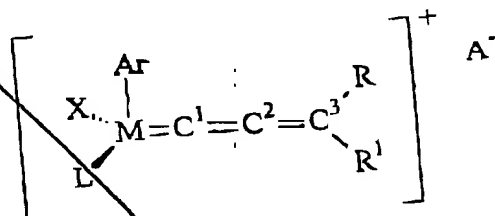
Z and Z<sup>1</sup> are independently selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>2</sub>-C<sub>20</sub> alkenyl, C<sub>2</sub>-C<sub>20</sub> alkynyl, C<sub>2</sub>-C<sub>20</sub> alkoxycarbonyl, aryl, C<sub>1</sub>-C<sub>20</sub> carboxylate, C<sub>1</sub>-C<sub>20</sub> alkoxy, C<sub>2</sub>-C<sub>20</sub> alkenyloxy, C<sub>2</sub>-C<sub>20</sub> alkynyloxy, or aryloxy, each Z and Z<sup>1</sup> optionally being substituted with C<sub>1</sub>-C<sub>5</sub> alkyl, halogen, C<sub>1</sub>-C<sub>6</sub> alkoxy, or with a phenyl group substituted with halogen, C<sub>1</sub>-C<sub>5</sub> alkyl or C<sub>1</sub>-C<sub>5</sub> alkoxy.

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25. (Amended) A method of performing ring closing metathesis, said method comprising contacting a diene with a catalytic complex under conditions appropriate, and for a time sufficient to produce a cyclic alkene, wherein the catalytic complex has the formula:



wherein

$\text{C}^1$  and  $\text{C}^2$  are  $\text{sp}$ -hybridized carbons and  $\text{C}^3$  is an  $\text{sp}^2$ -hybridized carbon,

wherein either or both of  $\text{C}^1$  and  $\text{C}^2$  are optionally absent;

M is selected from the group consisting of Os and Ru;

R and  $\text{R}^1$  are independently selected from the group consisting of hydrogen,  $\text{C}_1\text{-C}_{20}$  alkyl,  $\text{C}_2\text{-C}_{20}$  alkenyl,  $\text{C}_2\text{-C}_{20}$  alkynyl,  $\text{C}_2\text{-C}_{20}$  alkoxycarbonyl, aryl,  $\text{C}_1\text{-C}_{20}$  carboxylate,  $\text{C}_1\text{-C}_{20}$  alkoxy,  $\text{C}_2\text{-C}_{20}$  alkenyloxy,  $\text{C}_2\text{-C}_{20}$  alkynyloxy, or aryloxy, each R and  $\text{R}^1$  optionally being substituted with  $\text{C}_1\text{-C}_5$  alkyl, halogen,  $\text{C}_1\text{-C}_6$  alkoxy, or with a phenyl group substituted with halogen,  $\text{C}_1\text{-C}_5$  alkyl or  $\text{C}_1\text{-C}_5$  alkoxy;

X is an anionic ligand; and

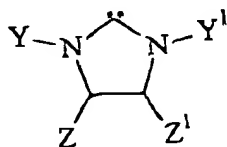
L is a nucleophilic carbene; and

Ar is an aryl substituent, bonded to M by an  $\eta^6$  bond

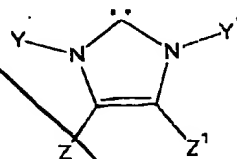
$\text{A}^-$  is an inorganic anion or an organic anion.

26. (Amended) The method of claim 25, wherein the nucleophilic carbene has the

formula:



or



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wherein

Y and Y<sup>1</sup> are independently selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>2</sub>-C<sub>20</sub> alkenyl, C<sub>2</sub>-C<sub>20</sub> alkynyl, C<sub>2</sub>-C<sub>20</sub> alkoxycarbonyl, aryl, C<sub>1</sub>-C<sub>20</sub> carboxylate, C<sub>1</sub>-C<sub>20</sub> alkoxy, C<sub>2</sub>-C<sub>20</sub> alkenyloxy, C<sub>2</sub>-C<sub>20</sub> alkynyloxy, or aryloxy, each Y and Y<sup>1</sup> optionally being substituted with C<sub>1</sub>-C<sub>5</sub> alkyl, halogen, C<sub>1</sub>-C<sub>6</sub> alkoxy, or with a phenyl group substituted with halogen, C<sub>1</sub>-C<sub>5</sub> alkyl or C<sub>1</sub>-C<sub>5</sub> alkoxy and;

Z and Z<sup>1</sup> are independently selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>2</sub>-C<sub>20</sub> alkenyl, C<sub>2</sub>-C<sub>20</sub> alkynyl, C<sub>2</sub>-C<sub>20</sub> alkoxycarbonyl, aryl, C<sub>1</sub>-C<sub>20</sub> carboxylate, C<sub>1</sub>-C<sub>20</sub> alkoxy, C<sub>2</sub>-C<sub>20</sub> alkenyloxy, C<sub>2</sub>-C<sub>20</sub> alkynyloxy, or aryloxy, each Z and Z<sup>1</sup> optionally being substituted with C<sub>1</sub>-C<sub>5</sub> alkyl, halogen, C<sub>1</sub>-C<sub>6</sub> alkoxy, or with a phenyl group substituted with halogen, C<sub>1</sub>-C<sub>5</sub> alkyl or C<sub>1</sub>-C<sub>5</sub> alkoxy.

cg 27. (Amended) The catalytic complex according to claim 9, wherein X and X<sup>1</sup> are independently selected from the group consisting of halide, carboxylate, alkoxy, aryloxy, and alkyl sulfonate.

cg 28. (Amended) The catalytic complex according to claim 27, wherein X and X<sup>1</sup> are both chloride.

29. (Amended) The catalytic complex according to claim 9, wherein the complex is linked to a solid support by means of a link between the nucleophilic carbene and said solid support.

30. (Amended) The catalytic complex according to claim 14, wherein X is selected from the group consisting of halide, carboxylate, alkoxy, aryloxy, and alkyl sulfonate.

31. (Amended) The catalytic complex according to claim 33, wherein X is chloride.

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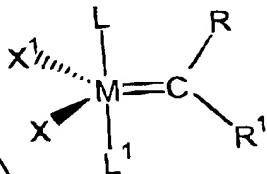
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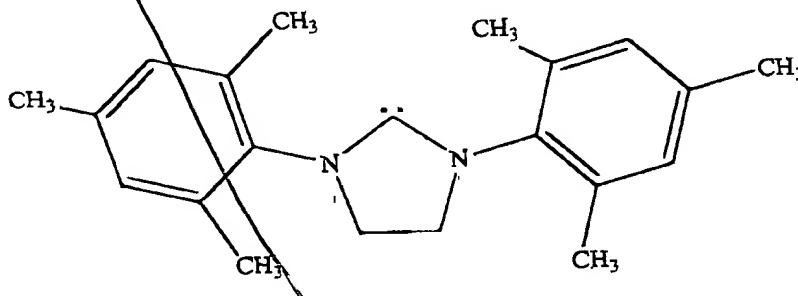
**Added Claims**

Please add new claims 39-78 as follows:

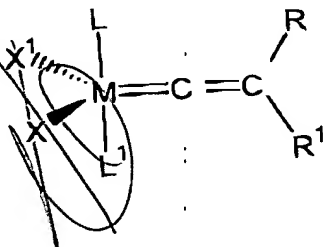
39. (New) The catalytic complex according to claim 9, wherein the catalytic complex has the formula:



40. (New) The catalytic complex according to claim 39, wherein L is -P(cyclohexyl)<sub>3</sub>, -P(cyclopentyl)<sub>3</sub>, or -PPh<sub>3</sub>; and L¹ is



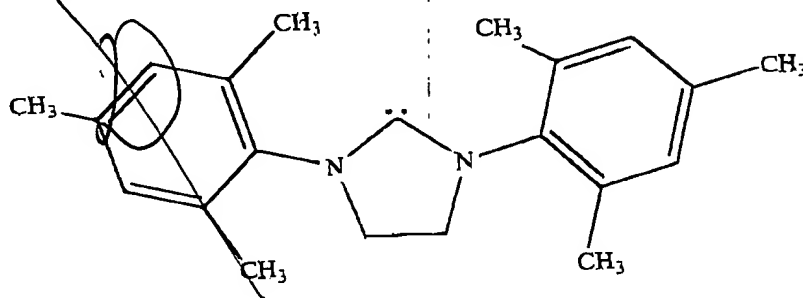
41. (New) The catalytic complex according to claim 9, wherein the catalytic complex has the formula:



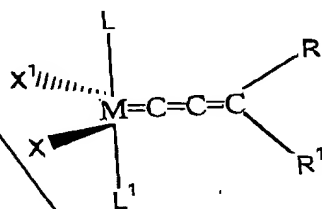
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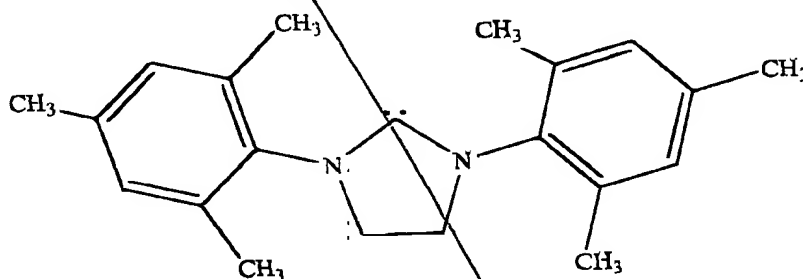
42. (New) The catalytic complex according to claim 41, wherein L is -  
P(cyclohexyl)<sub>3</sub>, -P(cyclopentyl)<sub>3</sub>, or -PPh<sub>3</sub>; and L<sup>1</sup> is



43. (New) The catalytic complex according to claim 9, wherein the catalytic complex has the formula:

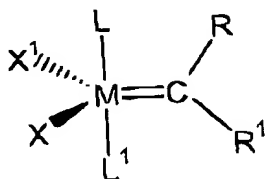


44. (New) The catalytic complex according to claim 43, wherein L is -  
P(cyclohexyl)<sub>3</sub>, -P(cyclopentyl)<sub>3</sub>, or -PPh<sub>3</sub>; and L<sup>1</sup> is

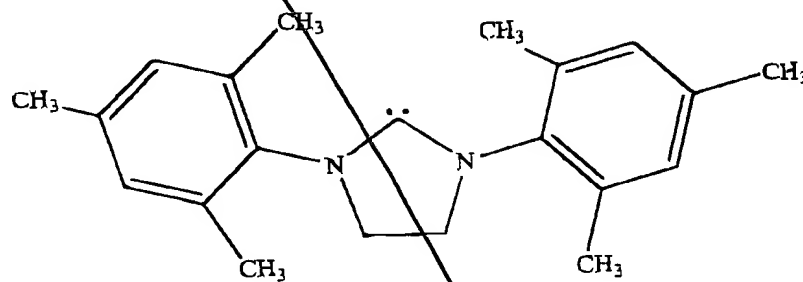


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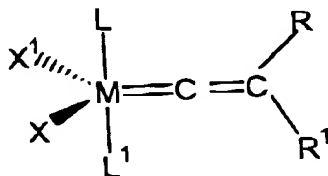
45. (New) The method according to claim 23, wherein the catalytic complex has the formula:



46. (New) The method according to claim 45, wherein L is -P(cyclohexyl)<sub>3</sub>, -P(cyclopentyl)<sub>3</sub>, or -PPh<sub>3</sub>; and L¹ is

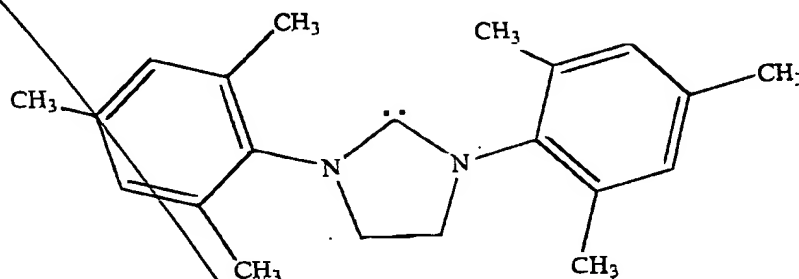


47. (New) The method according to claim 23, wherein the catalytic complex has the formula:

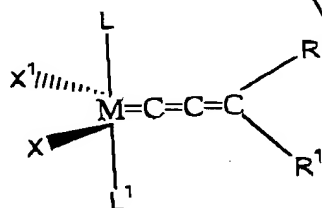


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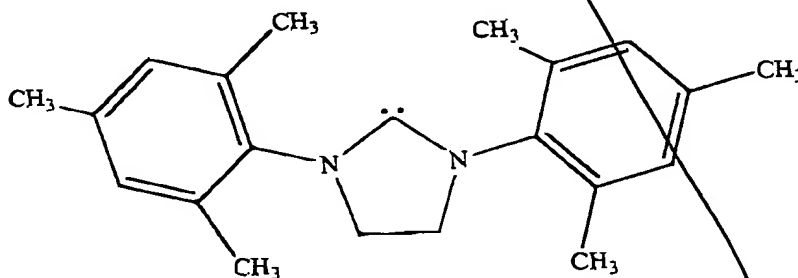
48. (New) The method according to claim 47, wherein L is -P(cyclohexyl)<sub>3</sub>, -P(cyclopentyl)<sub>3</sub>, or -PPh<sub>3</sub>; and L<sup>1</sup> is



49. (New) The method according to claim 23, wherein the catalytic complex has the formula:



50. (New) The method according to claim 49, wherein L is -P(cyclohexyl)<sub>3</sub>, -P(cyclopentyl)<sub>3</sub>, or -PPh<sub>3</sub>; and L<sup>1</sup> is

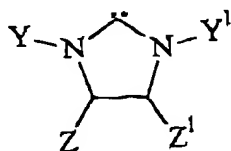


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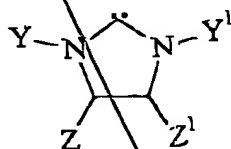
51. (New) A catalytic complex according to claim 13, wherein Y and Y<sup>1</sup> are both 2,4,6-trimethylphenyl and Z and Z<sup>1</sup> are both hydrogen.
52. (New) A catalytic complex according to claim 13, wherein Y and Y<sup>1</sup> are both 2,6-diisopropylphenyl and Z and Z<sup>1</sup> are both hydrogen.
53. (New) A catalytic complex according to claim 17, wherein Y and Y<sup>1</sup> are both 2,4,6-trimethylphenyl and Z and Z<sup>1</sup> are both hydrogen.
54. (New) The catalytic complex according to claim 17, wherein Y and Y<sup>1</sup> are both 2,6-diisopropylphenyl and Z and Z<sup>1</sup> are both hydrogen.
55. (New) The method according to claim 24, wherein Y and Y<sup>1</sup> are both 2,4,6-trimethylphenyl and Z and Z<sup>1</sup> are both hydrogen.
56. (New) The method according to claim 24, wherein Y and Y<sup>1</sup> are both 2,6-diisopropylphenyl and Z and Z<sup>1</sup> are both hydrogen.
57. (New) The method according to claim 26, wherein Y and Y<sup>1</sup> are both 2,4,6-trimethylphenyl and Z and Z<sup>1</sup> are both hydrogen.
58. (New) The method according to claim 26, wherein Y and Y<sup>1</sup> are both 2,6-diisopropylphenyl and Z and Z<sup>1</sup> are both hydrogen.

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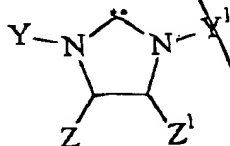
59. (New) A catalytic complex according to claim 13, wherein said nucleophilic carbene is of the formula:



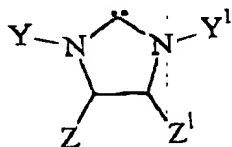
60. (New) A catalytic complex according to claim 17, wherein said nucleophilic carbene is of the formula:



61. (New) The method of claim 24, wherein the nucleophilic carbene has the formula:

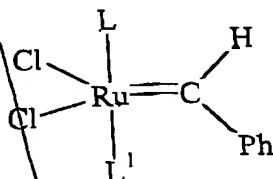


62. (New) The method of claim 26, wherein the nucleophilic carbene has the formula:



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63. (New) A catalytic complex of the formula:

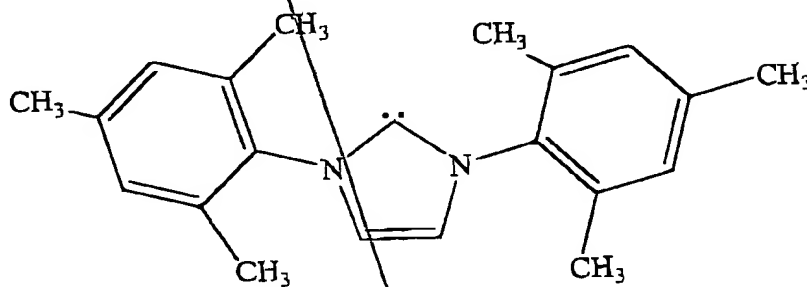


wherein

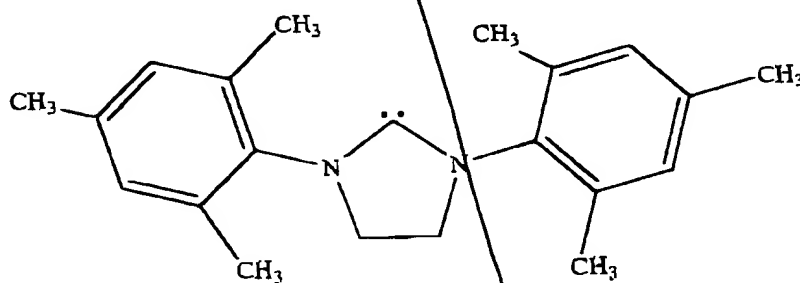
L is -P(phenyl)<sub>3</sub>, -P(cyclohexyl)<sub>3</sub>, or -P(cyclopentyl)<sub>3</sub>; and

L' is a nucleophilic carbene.

64. (New) The catalytic complex of claim 63, wherein L' is

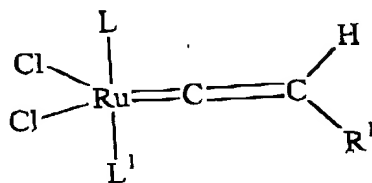


65. (New) The catalytic complex of claim 63, wherein L' is



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66. (New) A catalytic complex of the formula

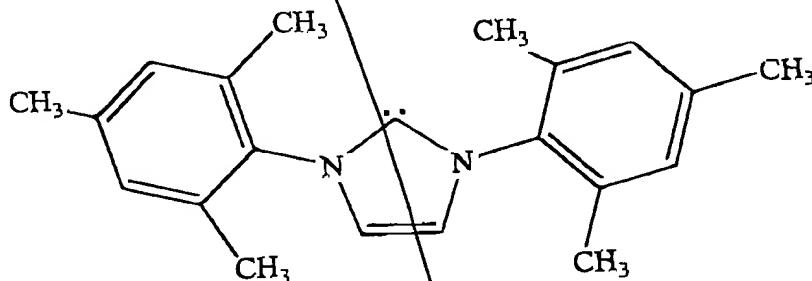


wherein L is -P(phenyl)<sub>3</sub>, -P(cyclohexyl)<sub>3</sub>, or -P(cyclopentyl)<sub>3</sub>; L¹ is a nucleophilic carbene; and R¹ is C<sub>1</sub>-C<sub>20</sub> alkyl.

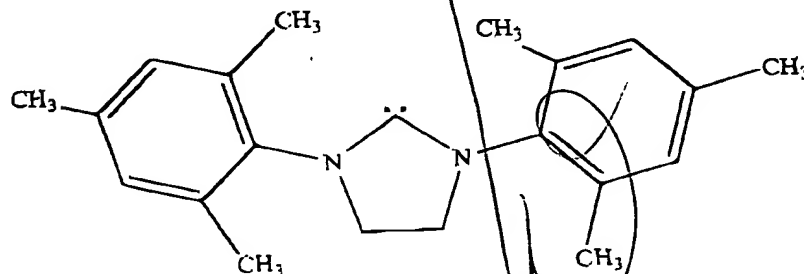
67. (New) The catalytic complex of claim 66, wherein R¹ is C<sub>1</sub>-C<sub>4</sub> alkyl.

68. (New) The catalytic complex of claim 67, wherein R¹ is tert-butyl.

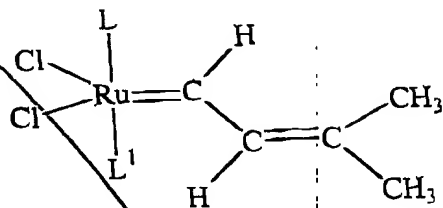
69. (New) The catalytic complex of claim 66, wherein L¹ is



70. (New) The catalytic complex of claim 66, wherein L¹ is



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71. (New) A catalytic complex of the formula:

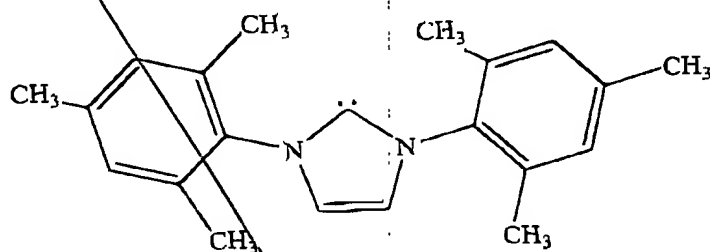


wherein

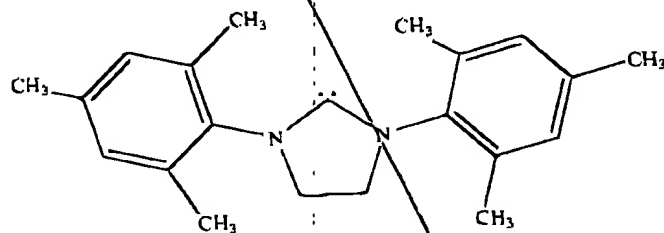
L is -P(phenyl)<sub>3</sub>, -P(cyclohexyl)<sub>3</sub>, or -P(cyclopentyl)<sub>3</sub>; and

L<sup>1</sup> is a nucleophilic carbene.

72. (New) The catalytic complex of claim 71, wherein L<sup>1</sup> is



73. (New) The catalytic complex of claim 71, wherein L<sup>1</sup> is



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74. (New) A method for synthesizing a polymer material, the method comprising contacting a monomer composition with the catalytic complex of claim 9.



75. (New) The method of claim 74, wherein the monomer composition comprises a plurality of olefin molecules.

76. (New) The method of claim 75, wherein the olefin molecules are cyclic olefin molecules.

77. (New) The method of claim 23, wherein the diene is a diterminal diene.

78. (New) The method of claim 25, wherein the diene is a diterminal diene.

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